IN THE CLAIMS:

Rewrite the pending claims as follows:

1. (Previously presented) In a system for navigating an object based on code and carrier-phase measurements obtained using signals on a first frequency and signals on a second frequency from a plurality of satellites, a method for continuing dual-frequency navigation during a time period in which signals from a respective satellite on the first frequency are lost, the method comprising:

performing dual-frequency navigation before the time period, including computing smoothed code measurements and corrections to an ionospheric model based on code and carrier-phase measurements obtained using signals from the respective satellite on both the first and second frequencies;

performing backup navigation during the time period by synthesizing a carrier-phase measurement on the first frequency from a carrier-phase measurement on the second frequency and from the corrections to the ionospheric model computed prior to the time period; and

transitioning to dual-frequency navigation using signals from the respective satellite on both the first and second frequencies in response to resumption of receiving signals from the respective satellite on the first frequency.

2. (Original) The method of claim 1 wherein computing the smoothed code measurements comprises:

smoothing a code measurement with a combination of carrier-phase measurements, the combination having an ionospheric delay that matches an ionospheric delay in the code measurement.

3. (Original) The method of claim 1 wherein performing dual-frequency navigation further comprises:

obtaining a modeled ionospheric bias term computed using the ionospheric model;

computing a measured ionospheric bias term using the smoothed code measurements; and

computing a correction to the modeled ionospheric bias term by taking a difference between the measured and modeled ionospheric bias terms.

4. (Original) The method of claim 3 wherein performing dual-frequency navigation further comprises:

obtaining a modeled ionospheric rate term computed using the ionospheric model;

computing a measured ionospheric rate term using differences of carrier-phase measurements between two measurement epochs; and

computing a correction to the modeled ionospheric rate term by taking a difference between the measured and modeled ionospheric rate terms.

5. (Original) The method of claim 1 wherein performing backup navigation further comprises:

obtaining a modeled ionospheric bias term computed using the ionospheric model;

computing an estimated ionospheric bias term using the modeled ionospheric bias term and the corrections to the ionospheric model computed before the time period;

computing the synthesized carrier-phase measurement on the first frequency using the estimated ionospheric bias term and the carrier-phase measurement on the second frequency.

6. (Original) The method of claim 1 wherein performing backup navigation further comprises computing estimated smoothed code measurements on both the first and second frequencies using the synthesized carrier-phase measurement on the first frequency, the carrier-phase measurement on the second frequency, and computation results obtained based on signals from the respective satellite on both the first and second frequencies received at the object before the time period.

7. (Original) The method of claim 6 wherein performing backup navigation further comprises computing updated corrections to the ionospheric model based on the corrections to the ionospheric model, the estimated smoothed code measurement on the second frequency, and a code measurement obtained using signals on the second frequency.

8. (Original) The method of claim 1 wherein transitioning to dual-frequency navigation comprises:

determining whether the time period exceeds a predetermined threshold;

in response to a determination that the time period does not exceed a predetermined threshold, determining whether a difference between a measured carrier-phase range and a synthesized carrier-phase range corresponding to the first frequency is sufficiently close to an integer number of the wavelength corresponding to the first frequency; and

in response to a determination that the difference between the measured carrier-phase range and the synthesized carrier-phase range is sufficiently close to an integer number of the wavelength, adjusting an estimated ambiguity value associated with the measured carrier-phase measurement or adjusting an estimated offset between a code measurement on the first frequency and a carrier-phase combination having an ionospheric delay that matches the ionospheric delay in the code measurement.

9. (Currently amended) In a system for navigating an object based on code and carrier-phase measurements obtained using signals from a plurality of satellites, a method for performing backup dual-frequency navigation when signals on one of two frequencies from one or more satellites are unavailable, comprising:

for each satellite from which signals on one of two frequencies are unavailable, generating a synthesized carrier-phase measurement on the one of the two frequencies that is unavailable from a measured carrier-phase measurement obtained using signals from the respective satellite on another one of the two frequencies, and from a first set of computation results obtained with respect to the respective satellite during steady-state processing when signals on both of the two frequencies were available from the respective satellite, and wherein the first set of computation results include corrections to an ionospheric model; and

generating smoothed code measurements on the two frequencies from the measured carrier-phase measurement, the synthesized carrier-phase measurement, and a second set of computation results obtained during steady-state processing when signals on both of the two frequencies were available from the respective satellite.

10. (Canceled).

11. (Original) The method of claim 9, further comprising:

updating the corrections to the ionospheric model.

12. (Original) The method of claim 10 wherein the corrections to the ionospheric model include an ionospheric bias term and an ionospheric rate term.

13. (Original) The method of claim 10 wherein the first set of computation results include those computed from smoothed code measurements.

14. (Original) The method of claim 13 wherein the smoothed code measurements are computed by forming combinations of carrier-phase measurements each having an

ionospheric delay that matches an ionospheric delay in a corresponding code measurement, and by smoothing the code measurement with the corresponding combination of carrier-phase measurements to remove multipath errors in the code measurement.

15. (Original) The method of claim 14 wherein the first set of computation results include those computed from smoothed offsets each between a smoothed code measurement and a carrier-phase combination corresponding to the code measurement.

16. (Original) The method of claim 15 wherein the second set of computation results include the smoothed offsets.

17. (Previously presented) In a system for navigating an object based on code and carrier-phase measurements obtained using signals on a first frequency and signals on a second frequency from a plurality of satellites, a computer medium storing therein computer readable instructions that when executed by a computer performs a method for continuing dual-frequency navigation during a time period in which signals from a respective satellite on the first frequency are lost, the instructions comprising:

instructions for performing dual-frequency navigation before the time period by computing smoothed code measurements and corrections to an ionospheric model based on code and carrier-phase measurements obtained using signals from the respective satellite on both the first and second frequencies before the time period;

instructions for performing backup navigation during the time period by synthesizing a carrier-phase measurement on the first frequency from a carrier-phase measurement on the second frequency and from the corrections to the ionospheric model computed prior to the time period; and

instructions for transitioning to dual-frequency navigation using signals from the respective satellite on both the first and second frequencies in response to resumption of receiving signals from the respective satellite on the first frequency.

18. (Original) The computer readable medium of claim 17 wherein the instructions for performing dual-frequency navigation further comprises:

instructions for smoothing a code measurement with a combination of carrier-phase measurements to form a smoothed code measurement, the combination having a ionospheric delay that matches an ionospheric delay in the code measurement; and

instructions for computing a correction to a modeled ionospheric bias term.

19. (Original) The computer readable medium of claim 17 wherein the instructions for performing backup navigation further comprises:

instructions for obtaining a modeled ionospheric bias term;

instructions for computing an estimated ionospheric bias term using the modeled ionospheric bias term and the corrections to the ionospheric model computed before the time period;

instructions for computing the synthesized carrier-phase measurement on the first frequency using the estimated ionospheric bias term and the carrier-phase measurement obtained using signals on the second frequency.

20. (Original) The computer readable medium of claim 17 wherein the instructions for transitioning to dual-frequency navigation comprises:

instructions for determining whether the time period exceeds a predetermined threshold;

instructions for determining, in response to a determination that the time period does not exceed a predetermined threshold, whether a difference between a measured carrier-phase range and a synthesized carrier-phase range corresponding to the first frequency is sufficiently close to an integer number of the wavelength corresponding to the first frequency; and

instructions for adjusting, in response to a determination that the difference between the measured carrier-phase range and the synthesized carrier-phase range is sufficiently close to an integer number of the wavelength, an estimated ambiguity value associated with the measured carrier-phase measurement or an estimated offset between a code measurement on the first frequency and a carrier-phase combination having an ionospheric delay that matches the ionospheric delay in the code measurement.